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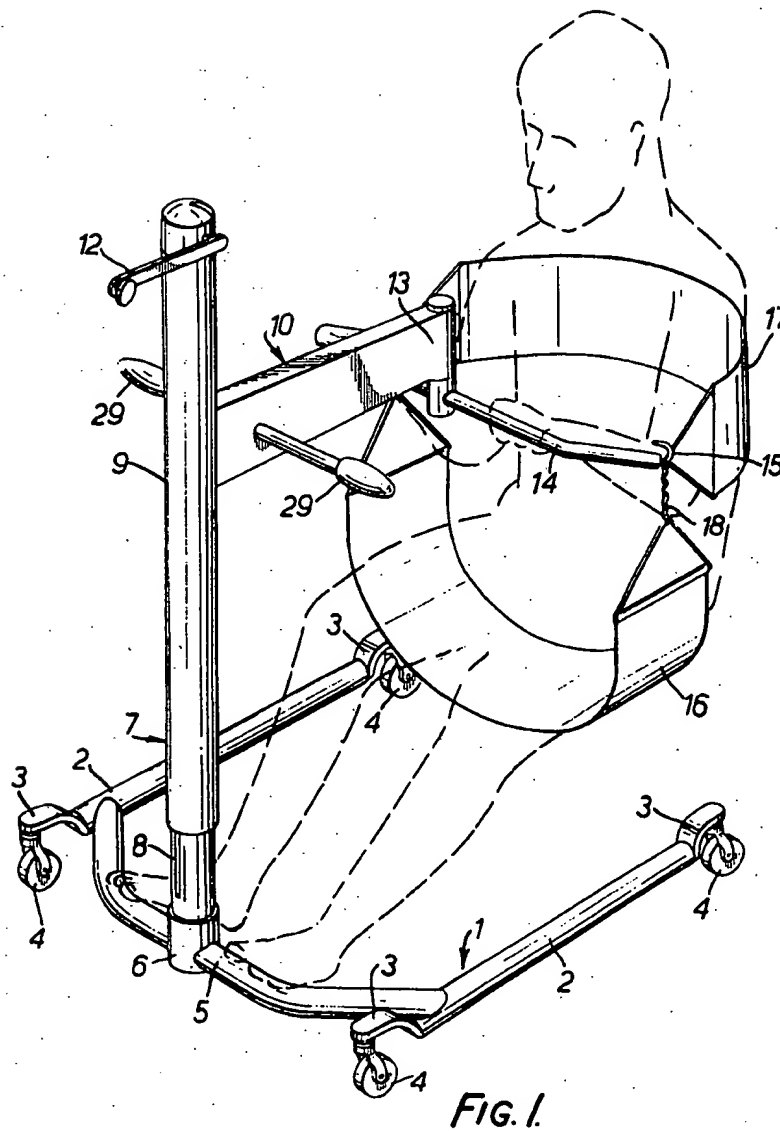
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APPARATUS FOR HANDLING DISABLED PERSONS

Filed June 16, 1969

2 Sheets-Sheet 1



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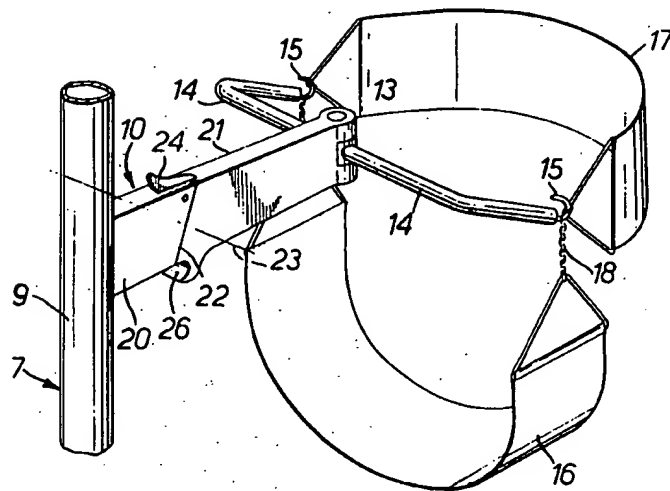


FIG. 2.

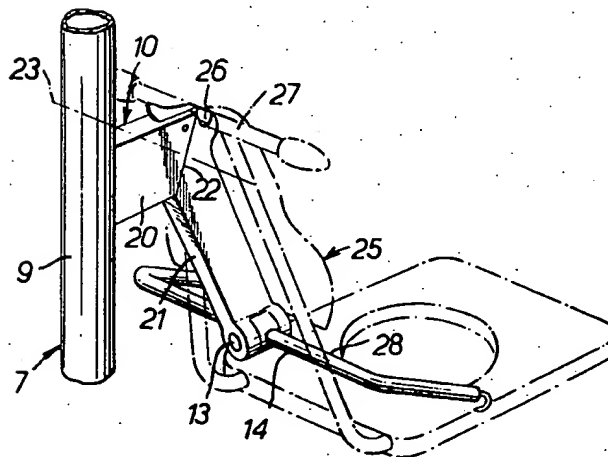


FIG. 3.

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## APPARATUS FOR HANDLING DISABLED PERSONS

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10 Claims

### ABSTRACT OF THE DISCLOSURE

Apparatus for handling disabled or infirm patients comprises a wheeled chassis on which is mounted an upstanding lifting column. A rigid cantilever lifting arm projects from the column. Means are provided to raise and lower the cantilever arm, and a lateral suspension hanger projects symmetrically on both sides of a rigid vertical bearing in the cantilever arm. The hanger provides spaced suspension points for a patient support sling.

This invention relates to apparatus designed to facilitate the handling of hospital patients or other persons who are disabled or infirm. It is concerned with apparatus which can be used to lift a patient from one situation and then transport and deposit the patient in another situation, for example to lift the patient from a bed and deposit that patient in a sitting position in a wheelchair.

According to the invention apparatus for handling disabled or infirm patients comprises a wheeled chassis on which is mounted an upstanding lifting column, a rigid cantilever lifting arm projecting from the column, means to raise and lower the cantilever arm and a lateral suspension hanger which projects symmetrically on both sides of a rigid vertical bearing in the cantilever arm and which provides spaced suspension points for a patient support sling. Reference herein to a "rigid vertical bearing" is to be construed as covering only bearing arrangements in which the suspension hanger is in use able to turn about the substantially vertical bearing axis but is otherwise constrained, that axis remaining substantially vertical as the arm is raised or lowered.

The column is preferably vertical and perpendicular to the wheeled chassis, at least in the fore-and-aft plane. That is to say, is vertical when viewed in the direction in which the lifting arm projects.

Apparatus in accordance with the invention can be readily designed so as to be of a cheap and simple construction which renders it particularly suitable for home use, the patient being supported in a simple sling and the dimensions being such that the apparatus can be wheeled about the house generally, and through standard size domestic doorways in particular. The suspension hanger is conveniently of curved or cranked form so that in a normal position the ends project forwardly and downwardly of the vertical bearing. With the bearing arranged at the free forward end of the cantilever arm this construction provides the maximum clearance for a patient when suspended in front of the arm facing the column. This is particularly important with relatively obese patients as the most convenient arrangement of sling to use will normally position the cantilever arm more or less at chest level.

The lifting column is desirably of tubular telescopic form with the lifting means in the form of a screw jack disposed within the column and operative to extend and contract the latter, with the jack incorporating right-angle gearing to allow an operating handle at the top of the column to be turned in a vertical plane, i.e. about a horizontal axis, at the right-hand side of the column. Handles

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for manoeuvring the apparatus may be of handlebar type projecting from the lifting arm itself adjacent the column, and for ease of transport and storage the lifting column may be detachable from a mounting socket on the chassis. This enables an apparatus to be designed which can "break down" and where necessary otherwise fold so that it can be stowed, for example, in a car boot. This results in a very convenient form of apparatus which private owners can take with them when travelling by car, the apparatus being used to lift them into and out of the car, and which medical staff such as district nurses can take with them on domiciliary visits to patients.

The chassis may be of tubular structure and conveniently comprises two side members, between and above which the arm projects, interconnected at one end by a cross member to which is fixed the mounting socket for the column. This provides a construction which is open at the forward end below the patient, the spacing of the side members desirably being such as to fit through a standard doorway and yet wide enough to fit around a normal wheeled invalid carriage and also W.C. pans for toilet purposes. Both the cantilever lifting arm and the chassis side members may be extendable to provide an increased reach, for example for this purpose being telescopic.

The lifting arm may be formed in two portions capable of relative articulation, means being provided to lock the two portions in the adjusted position. Articulation about a vertical axis may be employed, whereby a suspended patient can be offset laterally with respect to the chassis. Alternatively, the articulation axis may be inclined forwardly and downwardly with the front end portion of the arm cranked so that in the normal sling supporting position it projects forwardly and more or less horizontally from the rear portion. With this construction the front cranked portion can be turned through 180° about the articulation axis so that it projects in a generally downward and only slightly forward direction in which it provides a support bracket to which can be attached a more rigid patient support member generally in the form of a legless chair. This provides a dual purpose apparatus in the sense that it can be used with a simple patient support sling arrangement or, when more desirable, with a rigid chair-like support member. In the latter case the patient is supported with his back towards the lifting column, the support member can include rigid armrests and a detachable leg rest may be fitted so that the patient can sit with legs outstretched.

The front portion, while still being invertible in the fore-and-aft plane in order to provide the alternative of sling or chair support, may be formed so that it is detachable for inversion (as an alternative to articulation for this purpose) and is then refitted in the inverted position. In either case the front portion may provide a hook-on attachment for the chair support member disposed above abutments at a lower position against which the chair support member rests. These abutments may be on the lateral hanger.

In order to allow the patient to be lowered into a bath the overall height of the wheeled chassis forwardly of the column is desirably less than 5 inches, so that it will pass under any normal bath, and the patient support member, be it a simple sling or chairlike construction, should be capable of being lowered to this level. In some cases a backward inclination of the column may be desirable, so that as the patient is lifted his weight acts more towards the centre of the chassis with a resultant increase in stability.

A chair-like structure may also be provided which sits on the chassis and into which the patient can be lowered using the lifting arm and sling. This enables the patient to be lifted, for example from a bed, the chair-like struc-

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ture placed beneath the patient who is then lowered, and the lifting column subsequently removed to leave the patient sitting in what is in effect a wheeled invalid chair. The chair-like structure may be part of a chair unit with large detachable wheels the fitting of which acts to raise the front chassis wheels off the ground, thus providing a self-propelled invalid chair.

The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, two embodiments of patient handling apparatus in accordance with the invention. In the drawings:

FIG. 1 is a perspective view of the apparatus illustrating the support of a patient by separate back-support and buttock-support slings,

FIG. 2 illustrates similarly the other embodiment as used to support a patient in the same manner, and

FIG. 3 illustrates a similar view to FIG. 2 but showing how a chair-like support member may alternatively be used with this embodiment.

The apparatus in each case comprises a wheeled tubular chassis 1 comprising two underslung parallel side members 2 in the ends of which are fitted brackets 3 supported on castors 4. The chassis 1 is open at the forward end between the side members 2 and at the rear end is joined by a cranked tubular cross member 5 in the centre of which is fixed an upwardly facing socket 6 which supports a detachable and vertical lifting column 7. The column 7 is of telescopic tubular form with a lower inner portion 8 which drops into the socket 6 and an upper outer portion 9 to which is attached a forwardly and horizontally projecting cantilever lifting arm 10 of square-section tube. The column 7 incorporates a screw jack by which its telescopic length may be varied, thereby raising or lowering the lifting arm 10, and a bevel gear arrangement at the top of the column allows the jack to be operated through a right-hand side handle 12 which turns about a horizontal axis.

Referring now specifically to the construction of FIG. 1, at the forward end a rigid vertical bearing 13 is built into the lifting arm 10 and this bearing supports a tubular suspension hanger 14 disposed immediately below the end of the arm 10. The hanger 14 is curved so that in the usual position, in which it projects laterally of the arm as shown in FIG. 1, the ends of the hanger 14 project forwardly and downwardly with respect to the arm 10. The ends of the hanger have hooks or rings providing spaced suspension points 15, to each of which the corresponding ends of a buttock-support sling 16 and back-support sling 17 are detachably attached by short chains 18. The slings 16 and 17 are of simple strip-like form and enable a patient to be supported (as shown in broken lines) directly seated on the sling 16 in front of and facing the column 7 with the back of the patient supported against the sling 17.

The embodiment just described has been carefully designed as to its dimensions to provide a compact assembly particularly suited to domestic use and with a standard wheelchair. To this end, although modification of any of them may be found desirable to suit particular circumstances or conditions, the following dimensions have been found particularly advantageous:

Maximum height of chassis above castors 5 inches.

Overall chassis width 27¼ inches.

Overall chassis length 25½ inches.

Height of hanger attachment rings 25 inches minimum and 49 inches maximum, i.e. maximum lift 24 inches. Height of underside of lifting arm 28 inches minimum and 52 inches maximum.

Length of operating handle crank 5 inches and maximum height of free end of handle 67 inches.

Spacing from centre of column to hanger bearing axis 14½ inches.

The bottom support sling 16 for use with an apparatus

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in accordance with the invention is desirably of such length as to drop down to within 5 inches of floor level, thus allowing a patient to be lowered into a bath, but at the other extreme it should be capable of being lifted to a level of at least 29 inches so that it will clear any normal bed. It will be appreciated that instead of the separate support slings 16 and 17 which are illustrated, a single sling with buttock and back support portions can alternatively be used suspended from the attachment rings 15.

The embodiment of FIGS. 2 and 3 is identical with that of FIG. 1 except for the cantilever arm 10 which is formed in two portions, a rear portion 20 which projects horizontally from the column 7 and a forward portion 21 in the form of a cranked bracket. The two portions 20 and 21 are capable of relative articulation at an interface 22 about an axis 23 which projects downwardly and forwardly at an angle of about 55° to the vertical, the two portions having abutting flat end surfaces at the interface and at right-angles to this axis. A spring-loaded pivotable catch member (not shown) is operated by a release lever 24 which must be moved manually to allow the forward arm portion 21 to be turned, and the catch operates to lock that portion in either one of two possible positions illustrated respectively in FIGS. 2 and 3.

In the position shown in FIG. 2 a forwardly and downwardly cranked suspension hanger 14 supports two slings 16 and 17 as before, and turns about a rigid vertical bearing 13 to enable the apparatus to be used as already described. In the other position shown in FIG. 3 the arm portion 21 is turned through 180°, and in this inverted position it projects slightly forwards but mainly downwardly of the rear portion 20 to provide a support bracket for a rigid and detachable support member 25 in the form of a legless chair illustrated in broken lines in a position just prior to attachment. The bracket providing the arm portion 21 is formed with a hook-like recess 26 which faces upwardly in this arm position and into which a tubular back frame member 27 of the chair support 25 can be hooked. Abutments 28 on the hanger 14 provide a firm back support for the chair 25 against the weight of the latter and the patient seated thereon. The pivotable catch member already referred to, and controlled by the lever 24, when in its operative position acts not only to lock the front arm portion 21 about the articulation axis 23 but also to retain the chair frame member 27 in the recess 26.

In each embodiment side handles 29 which project from the arm 10 adjacent the column 7 enable the apparatus to be moved and manoeuvred on the castors 4.

I claim:

1. Apparatus for handling disabled or infirm patients comprising a wheeled chassis on which is mounted an upstanding lifting column, a rigid lifting arm projecting from the column, means to raise and lower the lifting arm, a lateral suspension hanger which projects symmetrically on both sides of the lifting arm and which provides spaced suspension points for a patient support sling, and rigid vertical bearing means by which the hanger is mounted adjacent the end of the arm remote from the column, whereby the hanger is constrained to turn about an axis which passes through said hanger and which remains substantially vertical as the arm is raised and lowered.

2. Apparatus according to claim 1, wherein the column is vertical and perpendicular to the wheeled chassis, at least in the fore-and-aft plane.

3. Apparatus according to claim 1, wherein the suspension hanger is of curved or cranked form so that the ends thereof project forwardly and downwardly of the vertical bearing.

4. Apparatus according to claim 1, wherein the column is telescopic and the means to raise and lower the arm comprise a screw jack within the column and operative to vary the telescopic length of the column, and including right-angle gearing between the screw jack and

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